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February 17, 1951

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



of Discovery

A SCIENCE SERVICE PUBLICATION

## MEDICINE

# Radiation Sickness Helped

**Five patients affected by X-Ray treatments for cancers of the stomach, lungs and other organs were aided by aureomycin.**

► PATIENTS suffering radiation sickness after X-ray treatments, and maybe future atom bomb victims too, can be helped by aureomycin, one of the so-called mold drugs.

Good results with the drug in five patients are reported by Drs. Isidore Arons and John W. Freeman of the Harlem Hospital of New York City.

The patients had been given X-ray treatments for cancers of the stomach, lungs and other internal organs. Nausea, vomiting and diarrhea and, in one case, an itching skin rash, resulted from the X-ray treatments. Aureomycin cleared these symptoms promptly. One patient noticed improve-

ment within five hours after the first dose.

Aureomycin is apparently the first drug that can stop symptoms of radiation sickness after they have started, although there are several which can prevent the symptoms when given before the X-ray treatments.

Aureomycin and other antibiotic drugs have previously been reported effective in prolonging lives of laboratory animals exposed to killing doses of radiation. These findings came from the search for remedies for atom bomb victims. Its good results in these studies have generally been attributed to its action against disease germs to which atom bomb radiation victims were particularly susceptible.

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## METALLURGY

# Titanium Promising

**Because it is as strong as annealed stainless steel and much lighter, its use as a structural metal in aircraft is receiving intensive study.**

► TITANIUM as a structural metal in aircraft has a promising future, according to recent studies by government agencies and private industry. Successful methods of reducing this metal from its plentiful ores are making it available in larger quantities and scientists are studying applications to which it can be put.

Because it is as strong as annealed stainless steel and only 57% as heavy, its use in airplanes is receiving intensive study. An important factor in its favor is its resistance to corrosion. Salt water has no effect on it. Scientists of the Boeing Airplane Company, and others, are investigating it as a replacement of stainless steel in airplanes. The National Advisory Committee for Aeronautics is studying its use for various aircraft structural applications.

The NACA has just issued a report entitled "A Structural-Efficiency Evaluation of Titanium at Normal and Elevated Temperatures." It includes findings of George J. Heimerl and Paul F. Barrett of work carried out at the NACA Langley Aeronautical Laboratory, Langley Field, Va.

The structural-efficiency evaluation of titanium includes comparison with several other materials. The comparisons indicate, the report states, that the high-strength aluminum and magnesium alloys are generally more efficient on a unit-weight basis

at normal temperatures than pure titanium sheet. For short-time loading conditions at temperatures beginning somewhat above 400 degrees Fahrenheit, titanium is more efficient than the aluminum alloys.

The melting point of titanium is 3,140 degrees Fahrenheit, which may be compared with 1,220 for aluminum and 1,204 for magnesium. The big trouble with titanium, Boeing scientists say, is that when heated above about 1,400 degrees Fahrenheit, it absorbs atmospheric gases and becomes brittle.

"Metallurgists say it is not likely that titanium's great affinity for other elements when it is extremely hot will ever be overcome," Boeing engineers state. "But even though that rules it out for some uses, there are still many places in aircraft where it can serve with great advantage."

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## AGRICULTURE

# Predict Conquest of Seed Corn Pest

► A PEST that causes extensive damage to germinating bean, corn, pea and other seeds may soon be written off the books as a result of experiments by scientists in the University of California Agricultural Experiment Station.

This is the seed-corn maggot which produces severe damage in several regions of the state.

Heretofore there was no known method of control, but now economical and effective control of this destructive worm can be predicted.

Commercial field treatments on 245,700 pounds of lima bean seed in the Santa Clara Valley gave adequate protection against the seed-corn maggot without producing any adverse effects upon seed emergence. Trials are also being made in other areas susceptible to maggot damage to determine the value of the treatments.

The seed-corn maggot is associated with low soil temperatures, high soil moisture, and a double-cropping practice of alternating lettuce or spinach and beans.

The non-harvested spring crop is disked into the soil, the field is furrow irrigated, and lima beans are planted as soon as the field is dry enough for the use of heavy equipment. Fly populations are greatly increased by the organic matter that is liberally applied in the form of rotting bean refuse and manures.

With the chemical treatments of the seed, damage to the bean cotyledons was greatly reduced.

One ounce of 25% lindane per 100 pounds of seed, combined with a suitable fungicide—used either as dusts or slurries—proved the most satisfactory of several treatments in the trials.

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## MEDICINE

# Blood Pressure Measured By Photoelectric Device

► A NEW photoelectric device is the key of a convenient method of measuring blood pressure which can be used with mammals ranging from men to laboratory guinea pigs and rats. Many small animals are used in experimental work to determine the value of various drugs and treatments. Taking their blood pressure with ordinary devices is not wholly satisfactory because often they first must be given an anesthetic.

Two Cincinnati, Ohio, scientists are responsible for the invention. They are William G. Brosene, Jr., and Harold J. Kersten. They received patent 2,540,163. American Cyanamid Company, New York City, has acquired patent rights by assignment.

The photoelectric device measures light passing through the foot of a rat, for instance, from a light source on the other side. From this measurement the effect of a special cuff on blood circulation is determined. The cuff, made of elastic material and technically called a manometric cuff, is positioned on the leg. There is a pressure gage connected to the cuff and an inflation system to vary the pressure in the cuff.

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## BIOCHEMISTRY

# Find Key to Photosynthesis

**Experiments by American-German scientific team show how photochemical process needing three quanta of light can be operated by light in one-quantum installments.**

**See Front Cover**

► THE key mechanism by which the green plant converts the energy of sunshine into food has been discovered by an American-German scientific team consisting of Dr. Dean Burk of the U. S. National Institutes of Health and Nobelist Otto Warburg, dean of German scientists now working in Berlin's American zone.

Through studies made in Berlin, Drs. Burk and Warburg have found that light energy is captured and utilized in carbohydrate production by a process that allows one light bullet—or quantum—to be effective.

The major puzzle in how photosynthesis works has been the way in which the photochemical process that needs three times the energy of one light quantum can be operated by light in installments of one quantum at a time.

In the Berlin experiments explained by Dr. Burk, who has just returned to this country, Chlorella alga was illuminated intermittently with monochromatic light of high intensity. They found that under illumination one glob or quantum of light caused an as yet unknown substance in the plant to join with one molecule of carbon dioxide and liberate one molecule of oxygen. Then in the dark, two-thirds of the energy gained is used in a combustion process that develops carbon dioxide and absorbs oxygen. The energy liberated by this combustion makes the unknown compound.

This cycle repeated three times fixes the energy necessary for one bit or molecule of carbohydrate, which about a year and a half ago Drs. Burk and Warburg showed needed three to four quanta to manufacture.

In the Berlin experiments light 20 times as intense as ever used before was turned on and off at minute intervals instead of the five-minute intervals used in previous photosynthesis experiments. This was important in allowing the discovery of what happened in the dark phase of the experiment.

Thus is explained a process that puzzled Dr. Albert Einstein himself when Dr. Warburg in the twenties sought his help in figuring out theoretically how three or four of the light bullets or quanta could be made to operate at the same time. Dr. Einstein in 1911 extended the late Max Planck's quantum theory to photochemical reactions. According to Dr. Einstein, the

initial photochemical step should involve the absorption of precisely one quantum, a condition that the new process now discovered fulfills. The father of Dr. Warburg in subsequent years showed this law really operated.

When the young Dr. Warburg consulted Dr. Einstein on his problem, Dr. Einstein told him to come back at a later date when his experiments allowed him to work with only one quantum since four quanta were too much for Einstein to handle theoretically.

The meaning of this discovery may prove to be as significant as the fissioning of uranium discovered in 1939 from which the atomic bomb development arose. Knowing now the way in which the green plant captures its energy, there will be an intensive search for identification of the mysterious and unidentified substance that is the first to pick up the energy in one quantum packets with great stability. Once this is discovered, the way should be clear

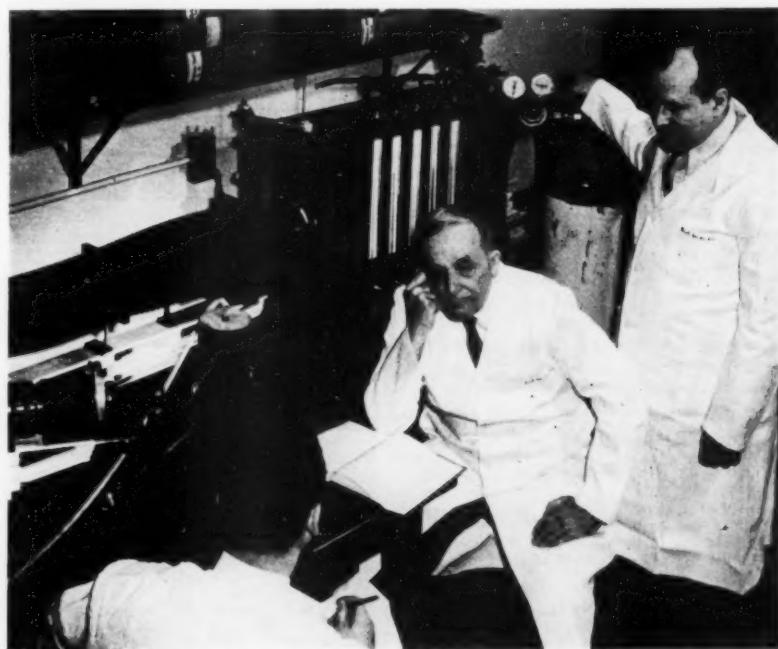
to increased efficiency of the photosynthesis process. Possibly a sort of artificial green plant, capable of factory use, can be developed to apply industrially the capture of the plentiful sunshine. If this can be done, economically, the world would be freed of its dependence for energy upon coal, oil, gas, wood and other fuels and synthetic food should be just around the corner.

The importance of the photochemical reaction of photosynthesis lies in its energy-building, or what the scientists call endothermic nature. It is an up-hill reaction, while most other reactions in nature are down-hill or exothermic reactions.

In the new work there is also the possibility that there will be practical conversion of light directly into electrical energy, although this may be farther in the future than manufacture of synthetic carbohydrates or the splitting of water into hydrogen and oxygen for burning.

In the intricate experiments of high precision that made the discovery possible, the minute of light used was standardized by two Bureau of Standards standard lamps which Dr. Burk took with him to Berlin when he went there early last summer to join Dr. Warburg who had just returned from an American visit working in U. S. Public Health Service laboratories at Bethesda, Md.

The crucial experiments, being reported shortly in detail in both German and Ameri-



**DISCUSS PLANS**—Prof. Otto H. Warburg, center, and Dr. Dean Burk, right, talk over plans for the photosynthesis research with a colleague at the National Cancer Institute in Washington during Prof. Warburg's stay in this country.

can journals, will be duplicated and extended in a new radiation laboratory set-up at the Smithsonian Institution in Washington, with Dr. Burk's cooperation. Dr. Victor Schocken, who previously worked with Drs. Burk and Warburg, will do research with Dr. Robert Withrow as director of the Laboratory.

A view of the Kaiser Wilhelm Institute

at Berlin-Dahlem is shown on the front cover of this week's SCIENCE NEWS LETTER. It was there that the latest discoveries in photosynthesis, which may unlock the mystery of how the green leaf uses sunlight, were made by Dr. Dean Burk of the U. S. National Institutes of Health and Dr. Otto Warburg, the German Nobelist in Chemistry.

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## PHYSICS

# Atomic Blast Effects

**Weather conditions play strange tricks and may make blast damage felt much farther away than is usual. No one can tell whether Nevada tests used larger bomb.**

► NEITHER the Russians nor anyone else can be sure that the Nevada atomic bombs just exploded are larger than those used in Japan or tested at Bikini, so far as the reported effects miles away are concerned.

For large explosions, atomic or otherwise, play strange tricks, producing blast damage as far away as 50 miles at certain points and leaving closer locations unharmed.

While the fifth Nevada blast on Feb. 6 was variously reported by observers at a distance to be larger than the previous tests, this may have been due to weather conditions.

The most authoritative material so far issued by the government, a detailed book "The Effects of Atomic Weapons" prepared by the Los Alamos Scientific Laboratory that appeared last August, explains that "under suitable meteorological conditions there is a focusing of incident and various reflected shock waves which may result in causing blast damage at certain

points as far as 50 miles from the explosion."

Some of the necessary weather conditions appear to be what is called a temperature inversion, that is, temperature that has been falling with increasing altitude begins to increase. This inversion of temperature needs to be relatively near the ground for the curious explosion effects to occur, and there should be surface winds of low velocity and a region of high atmospheric pressure.

While there were probably differences in the magnitude of the Nevada explosions, none of them seems to have been a thousand times the known A-bomb blasts such as at Bikini. This is the kind of explosion a full-fledged hydrogen superbomb might be expected to produce. There is still the possibility that a hydrogen bomb of smaller than optimum proportions was actually tested, with the deuterium-tritium material in it "ignited" by an A-bomb "trigger." If this were the case—and it is speculation,

of course—a hydrogen bomb might have been tested with a bang not markedly larger than a big plutonium or A-bomb.

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New techniques have revealed that there are traces of such metals as barium, titanium, lithium and rubidium in the *human body*.

Better hens are to be bred in Venezuela with the recent importation, by airplane, of prize Barred Rocks from the United States.

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## ASTRONOMY

# Supernova Is Dying Star

**Each star comes to the explosive stage when it uses up most of its original hydrogen supply. Our sun will probably begin exploding some 40 billion years from now.**

► A SUPERNOVA or "new star" that suddenly blazes forth, then slowly fades away forever, is just an old star that has run out of fuel, Prof. George Gamow of George Washington University told the National Capital Astronomers.

"Each star comes to the explosive stage of its life when it uses up most of its original hydrogen supply," Prof. Gamow said. "It probably starts with a series of minor explosions which increase in power as the period between them lengthens until finally the dying star bursts to form a supernova."

The total energy liberated by a star throughout a century, for instance, is about the same whether it has a series of little explosions, such as those typical of U-Gemini stars, or several big explosions, such as recurring novae, Prof. Gamow reasons. These different types of explosions correspond to different stages in the star's evolution.

Stars that within our lifetime explode to form novae have just come of age, he pointed out. The brighter and more massive

a star, the shorter in all probability will be its life span, Dr. Gamow reported.

The stars which are four or five times more massive than our sun have a life-span of three billion years which equals the present age of the universe. It is those stars which run out of fuel and start exploding now.

As the universe grows older, less and less massive stars will reach the explosive stage. Our sun will probably begin exploding some 40,000,000,000 years from now, the George Washington University professor calculates.

The earth and all the planets will be vaporized when our star becomes a nova, but the threat of such destruction is still a long way off. Should the star nearest to us become a nova, or even a supernova, there is also little danger. It would shine with the brightness of many, many full moons, but would still be too far away to do us much harm.

A supernova explodes in our own Milky Way galaxy only once every three or four

centuries. These stars have used up all their hydrogen fuel and have no resources of their own, so this is their last bid for notice, their swan song. Headed for collapse, they go out in a brilliant explosion like that which 900 years ago created the Crab Nebula which even today is still expanding.

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## PALEONTOLOGY

## Florida Was Haven For Ice-Age Mammals

► FLORIDA'S sunny beaches were a haven for mammals fleeing the north's cold thousands of years ago.

Fossil bones of more than 50 mammal types, about half of them now extinct, were studied by Dr. C. Lewis Gazin, curator of vertebrate paleontology at the Smithsonian Institution. The bone deposits were recovered near Melbourne, Fla., mixed with remains that were human and differed in no major respect from human remains of today.

Among the animals identified and known to have been extinct for more than 10,000 years are the great sloth and three kinds of armadillos. These fossil bones were mingled with opossums, moles and bats looking much like the same forms today.

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## BACTERIOLOGY

## BW Techniques Used In Germ Studies

► WITH TECHNIQUES that could be used for germ warfare, large scale production of bacterial mutants is being pushed at the University of Illinois.

Mutants are explained as individuals in whom the links of ancestry are meshed a little off-side. Six-fingered humans are an example. Mutants in the bacterial world may be resistant to almost any known medicine. These could be used in germ warfare.

University of Illinois scientists, however, are interested in bacterial mutants for peaceful purposes such as testing new medicines, learning how to cut down on bacterial spoilage in the food industry and discovering new vitamins.

The speed with which bacteria reproduce makes them useful research tools for many purposes, Prof. H. Orin Halvorson, head of the university's bacteriology department, explains.

Within 24 hours a single bacterium can have 200 billion descendants. Only one in a billion of these may be a mutant, but that still could give 200 mutants in 24 hours from a single ancestor.

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In a few sections of the South, geese are used by cotton growers to keep the cotton fields free from grass.



**RADIATION DETECTION**—This "emergency team" is demonstrating how radioactivity could be measured in case of an atomic blast. The team is from the Knolls Atomic Power Laboratory of General Electric. The man in the foreground records readings reported by the other two and radio-telephones the information to a central plotting point.

## GEOLOGY

# Mexico Has Grand Canyon

**Within a three-day motor trip, is the Barranca de Cobre canyon, described as more spectacular, though less colorful, than our Grand Canyon.**

► MEXICO'S rival to the Grand Canyon, Barranca de Cobre canyon, can be reached by a three-day motor trip southward from New Mexico.

This was demonstrated by three New Mexico University scientists, Prof. Wilfrid D. Kelley, Dr. Paul Fitzsimmons and Charles Maxwell, who visited the newly acclaimed geological wonder by jeep trip.

The canyon can be reached more easily from New Mexico to the north than by the usual approach from the Gulf of California to the west.

The "hidden" canyon, cut by the Rio Urique, stretches from northeast to southwest some 300 air miles southwest of El Paso, Texas.

From Albuquerque to the rim of the canyon was a full three-day drive, compared to something like 12 days by motor vehicle and pack train from, say, Los Angeles.

The three scientists pushed through the wild and rugged Sierra Madres, land of the primitive Tarahumara Indians, to the wonder that vies with the Grand Canyon for scenic beauty and scientific interest.

They saw nothing at the canyon to indicate there is anything in the region of unusual interest to scientists with the possible exception of a few plants and mineral deposits.

They agreed that Barranca de Cobre is more spectacular in appearance than Grand Canyon.

At its northern tip, the canyon appears to be six to eight miles wide and 5,000 feet deep. In places it may reach an 8,000-foot depth. The length, reported to exceed 100 miles, could not be estimated from the north end. Grand Canyon is some 200 miles long, 3,500 to 6,000 feet deep, and 5 to 15 miles wide.

The New Mexicans did not enter the canyon but found it is accessible on foot or by pack animal from the north tip. They carefully viewed it with binoculars and took pictures.

In contrast to Grand Canyon's sandstones, Barranca de Cobre cuts mostly through volcanic tuff (compressed volcanic ash) and so is less colorful. Buff is the predominant color, although a baby blue haze and shadow effects cause breath-taking variations.

The gorge is narrower than Grand Canyon's but has steeper sides covered with evergreens, mostly pines, and a wide variety of vegetation ranging from sub-Alpine to tropical types. Wild life is abundant.

The New Mexicans hope to return to the canyon in another winter season and explore part of the canyon, eventually traveling westward to the Gulf of California.

They saw huts and cabins on mesas (tableland) in the canyon and some drought-stricken farms.

At least one Indian family was living cliff-dweller style in a cave, and a few carried bows and arrows and wore breech cloths for dress.

Other notes from the travellers' log:

The paved road ends at Chihuahua City, 230 miles inside old Mexico. From there it is 200 miles over bad dirt road fit only for a jeep, truck, or high-centered auto to the town of Creel, less than 50 miles from the canyon rim.

There is only a rough trail from Creel. The New Mexicans drove over a railroad bed on which track had not yet been placed and through ten tunnels and numerous draws. To avoid the rainy season, October to March are the best travelling months.

Pack animals and their Indian owners can be hired at the canyon.

Gasoline, oil, some foods, and a few other basic items can be bought all the way into Creel. Other items must be packed in.

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## MEDICINE

## Three Chemicals Are Substitutes for Plasma

► IN CASE of an atom bomb attack or other large scale disaster, three chemicals could be used to eke out the supply of blood and blood plasma.

The three are: Gelatin, dextran and polyvinyl pyrrolidone. The gelatin is a particular kind known as osseous gelatin that comes from the bones of cattle, particularly the shin bones. The form used as a plasma substitute is also sometimes called P-20.

Dextran is a sugar fermentation product developed in Sweden. Polyvinyl pyrrolidone, or PVP for short, is a synthetic chemical made from formaldehyde and acetylene. It was developed in Germany during World War II. The Germans called it periston.

Okra, vegetable widely grown in southern United States, has recently been announced as another possible source of a plasma substitute. So far it has only been tried on animals, so its actual value is not yet known.

None of these chemicals can take the place of whole blood or blood plasma. The

vital fluid from human veins is still needed in large quantities both for the fighting forces in Korea and for any possible large scale disaster at home. The substitutes can save life temporarily, tiding a patient over for a few hours or a day until one of two things happens: 1. His own blood-forming organs begin to make enough new blood for him. 2. He can be given a transfusion of whole blood or plasma.

Dextran, gelatin and PVP act to restore fluid in the blood circulation and they will not harm the patient. But they can not perform blood's vital function of carrying oxygen to all parts of the body.

PVP has another potentially important medical use. Combined with iodine, it promises on the basis of tests to date to be a remedy for some hitherto unconquered germ diseases. Apparently the PVP acts to detoxify iodine so that doctors can safely give enough iodine to let this chemical destroy germs.

Rapid marked improvement, sometimes in 15 to 20 minutes, is reported achieved in colds and grippe, and some 100 cases of skin infections have been cleared up by this PVP iodine. The tests, which need further study, have been carried out by Dr. Herman A. Shelanski of the Philadelphia General Hospital.

PVP for plasma substitution use is now being made at the rate of 25,000 units per month and production is expected to go to 350,000 units monthly by May 1, the manufacturer, General Aniline and Film Corporation, announces.

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## RESOURCES

## Lignite Deposits Source for Wax

► A VAST reserve of montan wax lies right here in this country to be tapped should our imports be cut off again as they were during the last war.

Montan wax is an industrially important ingredient of shoe polish, electrical insulating materials, inks, carbon paper and greases, among other items. Prior to the last war, we imported our supply of this vital wax from Germany.

To take care of our needs in case of another cut-off from this source, the U. S. Bureau of Mines surveyed our lignite deposits from which the wax can be extracted. W. A. Selvig, W. H. Ode, B. C. Parks and H. J. O'Donnell, of the Bureau's Central Experiment Station in Pittsburgh, report that the deposits from certain areas, notably Arkansas and California, give high yields of the wax.

Particularly rich in the wax are lignites that were once finely divided vegetable debris. This debris was long ago washed or blown into swamps or shallow water where the internal cells and the woody tissues rapidly decayed. The more decay-resistant parts now yield the wax.

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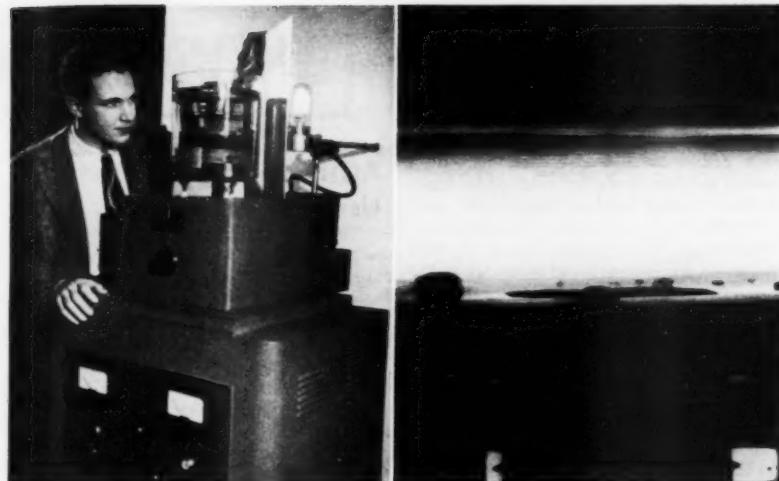
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**INAUDIBLE SOUND PICTURED**—Dr. Patrick Conley, Westinghouse physicist, shows the equipment used in making ultrasonic wave pictures. A quartz crystal is immersed in the jar of oil on top and this vibrates when an electrical voltage is placed across it. A bright light shines through the ground glass held by Dr. Conley. The fine lines in the picture on the right result when the crystal is vibrating 750,000 times a second, far beyond the audible range.

## MEDICINE

## Improved Artificial Hands

Korean casualties included among 28 soldiers fitted with new hands and hooks moved by the arm muscles themselves. Less conspicuous and have better control.

► TWENTY-EIGHT soldiers who have lost hands, including some Korean casualties, have now been fitted with a new improved type of artificial hands and hooks, Col. W. A. Spittler of the U. S. Army Medical Corps and chief of the orthopedic section at Walter Reed Army Hospital, Washington, D. C., reported at the meeting of the American Academy of Orthopaedic Surgeons.

The hands and hooks are moved by the arm muscles themselves, thus giving better control with less conspicuous movements than with the former types. In order to attach the new hand or hook, the surgeon incorporates a loop of skin from the arm into the muscle which is drawn through a puncture wound of the stump. The control cable, which works the device, is attached to this loop of skin and muscle by a plastic pin.

A sense of "feeling" as to the size and sensation of the object grasped and power at the "new finger tips" are given when the muscle motors are fitted to the new hands and hooks. There is enough power to crush a tin can but the device is delicate enough to handle an egg without

breaking it. An amputee who has had the new muscle surgery can even work under his car.

The muscle motors can without too much difficulty be attached to the usual hands and hooks which have been available for some time.

"The amputees who have been fitted so far are as a rule so proud of the added use they receive out of their appliance that they encourage others to have the same procedure done," Col. Spittler stated.

Success with the suction socket for an artificial leg, tried on 125 patients in the last five years, was reported by Dr. Robert Mazet, Jr., of the Veterans Administration Center in Los Angeles.

Women and children as well as men can be satisfactorily fitted with this type of artificial leg. It can be worn successfully when only four inches of the lower extremity remains. Above-knee amputees can also be successfully fitted with it.

Only one fitting is now needed, and of the 125 patients studied, only two needed a second socket to get a satisfactory fit.

## OPTICS

## Best TV Viewing Distance More Than Ten Feet

► DOCTORS AS WELL as lay persons are asking about the best distance from the screen for viewing television. Answers to this question, given by "three competent medical authorities," have now been published in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Feb. 3). All three authorities gave just about the same answer. Here it is:

As a general recommendation for small- or moderate-sized screens, a distance of roughly 10 times the diameter of the screen is found most comfortable for clear viewing and avoidance of eye fatigue.

This, substantially, is the same opinion as that expressed by the American Society for Prevention of Blindness.

One authority says "the optimal distance from which one should watch television varies from one person to another, depending at least partly on his state of refraction and on the size of the screen. Placement of furniture and room size also influence one's preference. In general, a distance of 10 feet or more would be preferable, since then there is necessary only a moderate amount of convergence and accommodation. One should avoid sitting closer than five feet."

"Changing occasionally from one chair to another should help in avoidance of fatigue not only of the sense of vision but of the neck muscles. Regardless of the distance of viewing, there seems to be no evidence that eye fatigue in the 'normal' eye will cause pathological (disease) changes. The chief problem is that of comfort."

One of the other authorities said that the more defects there are in the television picture, "the greater is the tendency of visual fatigue."

"This," he said, "includes such defects as out-of-focus pictures, those that are too dim, too flat and with too much contrast, and those that weave and jump. The viewing distance should therefore not be near enough for these defects, especially the graininess, to be overly apparent. This is more important than size of the picture, although the graininess and size may go together. Furthermore, the appearance of graininess will increase with the increase in brightness of the screen. Television should be observed in a lighted room, so that there is not too great a contrast between the screen and the background."

The third authority said that "when television is viewed from a distance less than 10 times the diameter of the television tube, no harm whatever is done to the eyes but the picture loses in quality as the scanning lines then become visible."

Science News Letter, February 17, 1951

## ASTRONOMY

**Few Will See Year's New Comets**

► TWO NEW comets are now speeding across the heavens, but they are both so faint that a telescope is needed to see them.

The year's first comet, of ninth magnitude, is so close to the sun it is not displayed against a background of dark sky and so is particularly difficult to spot.

This visitor from space was discovered by Miss Ludmilla Pajdusakova of Skalnate Pleso Observatory in eastern Czechoslovakia on Feb. 4 in the constellation of Delphin, the dolphin. It has since been spotted by astronomers both in Europe and in the United States, looking for it shortly before sunrise.

An eleventh magnitude comet was found in the constellation of Gemini, the twins, by Dr. S. Arend and F. Rigaux of the Royal Observatory in Uccle, Belgium.

Word of these discoveries was cabled by Mlle. J. M. Vinter-Hansen of Copenhagen to Harvard College Observatory, astronomical clearing house for the western hemisphere.

Science News Letter, February 17, 1951

## PSYCHOLOGY

**Any Personality Can Become Alcoholic**

► ANY KIND of personality—happy, sad, extravert, introvert—can become an alcoholic. Furthermore, whether or not you have a "mother attachment" has little to do with becoming an alcoholic.

Alcoholism is not determined by personality traits and an entirely different approach must be made to the explanation of alcoholism.

These are the conclusions drawn by three scientists after a study and comparison of 37 different attempts by other scientists to discover what, if any, personality traits tend to be the cause of alcoholism.

Dr. Edwin H. Sutherland, professor of sociology at Indiana University, H. G. Schroeder, Menard, Ill., and C. L. Tordella, of Indiana, found that these research projects, made over the past 15 years, contained many contradictions, were sometimes statistically inadequate and came to conclusions not backed up by the evidence presented.

The three sociologists based their conclusions mainly on a study of the results of ink-blot tests given by other researchers to different groups of alcoholics. Some researchers using this test found alcoholics as a group leaning very slightly toward extraversion. Another author found that 70% of one group of alcoholics were introverts by one test, and only 20% by another test.

Similar contradictory results were found in tests for immaturity and other personality traits.

The authors contend that the results of these ink-blot studies have not demonstrated any respect in which alcoholics differ from nonalcoholics.

Dr. Sutherland and his associates looked with considerable skepticism on tests which purported to show that alcoholism is a result of doting mothers or stern fathers or that alcoholics tend to be more neurotic and psychopathic than non-drinkers.

"Obviously," the authors declared, "the disagreement among investigators as to the fact of mother attachment is so decided that no conclusion regarding the genetic significance of mother attachment is justified."

Dr. Sutherland and his associates suggested to researchers that alcoholics are not homogeneous and they must be broken into more homogeneous categories before the characteristics associated with alcoholism can be isolated.

Science News Letter, February 17, 1951

## AGRICULTURE

**Farm Production Is Limited by Weeds**

► WITH GREATER emphasis than ever on abundant farm production during the mobilization period, science's big guns are being trained on weeds—one of the farmer's most destructive foes.

"Weeds reduce agricultural yields by competing with crops for space, soil nutrients, and water," explained Dr. J. Earl Coke, director of the University of California Agricultural Extension Service. "They greatly increase the manpower requirements for producing crops. Weeds harbor disease and insects and prevent mechanization, or decrease the efficiency with which crops are handled mechanically. I know some crops where the cost of weed control has equaled all other direct production costs."

Weeds represent the biggest single problem in the alfalfa and clover seed industry. Adequate method of controlling weeds would open the way to almost complete mechanization of both cotton and sugar beet production. Elimination of weedy brush species is the first requirement of the program to expand livestock production on much of America's range land.

"The many new chemicals becoming available and the numerous regulations affecting their use make weed control a more complicated science than it was in the days of the man with the hoe," said Dr. Coke.

"It is, therefore, encouraging that all interested groups—farmers, the USDA, agricultural commissioners, commercial concerns, seed companies and the universities—are training their big guns on this problem in a mass attack."

Science News Letter, February 17, 1951

**IN SCIENCE**

## MEDICINE

**ACTH and Gold Used for Arthritis**

► BETTER RESULTS in arthritis may be obtained by combining gold salts treatments with ACTH, famous pituitary gland hormone now used as an effective arthritis remedy.

Studies showing this are reported by Drs. H. M. Margolis and Paul S. Caplan of Pittsburgh (JOURNAL, AMERICAN MEDICAL ASSOCIATION, Feb. 10).

Advantage of the combined treatment, their experience shows, is that patients do not suffer relapses after the hormone treatment is stopped. These relapses have been a discouraging feature of ACTH treatment for arthritis. Seven patients given combined treatment held their improvement without relapse for from 30 to 229 days after ACTH was stopped.

General measures in arthritis treatment should not be abandoned because of the discovery of ACTH and cortisone, the Pittsburgh doctors point out. Once the ACTH has stopped pain and inflammation, advantage should be taken of this to give exercises for increase of muscle strength and tone. ACTH gives immediate functional rehabilitation months before gold treatment has gone on long enough to produce any possible good effects. The ACTH can therefore be used for a "holding action" in treatment.

Science News Letter, February 17, 1951

## PLANT PATHOLOGY

**Tobacco Disease Found in Pennsylvania**

► BLACK SHANK, a serious disease afflicting tobacco plants, has been found for the first time in Pennsylvania.

Dr. A. H. Bauer, of Pennsylvania State College, reports that he found more than 200 afflicted tobacco plants on a farm in Lancaster County, Pennsylvania. Circumstantial evidence points to tomato plants which were shipped to the locality from a southern state as the disease-spreader, he believes.

Black shank, spread either by water or by soil, was first discovered in North Carolina in 1930. It now affects over one-third of all the tobacco farms in that state, and causes serious losses to the whole tobacco-growing region of the South.

The only way now known to fight the disease is with resistant plants, but these have not yet been developed for the northern tobacco plants.

Science News Letter, February 17, 1951

# ENCE FIELDS

## ENGINEERING

## Radioactive Material Used to Test Soil

► RADIOACTIVE material and a radiation pick-up unit are in experimental use by engineers of Rutgers University to measure soil density and thus assist in the construction of crack-proof paving on highways and airport runways.

The apparatus used consists of two steel tubes, the radioactive isotope cobalt-60, a radiation pick-up unit, shielded cable, a lead shield for the surface, and a radiation indicator. Two five-inch parallel holes are drilled in the soil to any desired depth, and one of the steel tubes placed in each.

The radioactive material is in one tube, and the pick-up unit in the other. The amount of radiation transmitted from one tube to the other depends mainly upon the density of the soil.

Science News Letter, February 17, 1951

## PUBLIC HEALTH

## Medical Chief in Korea Stopped Typhus in Italy

► THE FACT that Major General Edgar Erskine Hume is chief surgeon for the Far Eastern Command should reassure anyone worrying over the danger of typhus fever spreading to our fighting forces in Korea. Because Gen. Hume as military governor in Italy during World War II is generally credited with having applied the measures that stopped the typhus epidemic there in 1943 and 1944.

In war-devastated Naples about 40 cases of typhus a day were developing among the civilian population, with a death rate varying from 4% to 54%, depending on the age of the patient. Up to the end of May there had been about 2,000 cases among the civilian population but at most two cases in military personnel.

DDT powder to kill the lice that spread typhus fever and the vaccine developed by American scientists to protect against the disease were the measures applied then under Gen. Hume's direction.

The same measures will be applied now to protect our fighting forces in Korea. In addition we have one new weapon against typhus. This is the antibiotic drug, chloromycetin. Army tests have shown that as a remedy this drug is "just as good" for the kind of epidemic typhus in Korea as for the scrub typhus of the Pacific which it cures.

There are three kinds of diseases called typhus fever. One, reported epidemic among

North Koreans and Communists in Korea now, is spread by lice. It is the typhus that has plagued European countries for centuries during periods of war and famine. It has a high mortality.

Another kind of typhus, called murine typhus, exists in the United States, especially in the South. This is a mild disease and is spread by rat fleas. Third disease labelled typhus is the scrub typhus, or tsutsugamushi disease, that threatened troops in the South Pacific during World War II.

Science News Letter, February 17, 1951

## MEDICINE

## Plasma Substitutes Tried at Korean Front

► DEXTRAN, blood plasma substitute developed in Sweden, is being given the wounded at the Korean front. A special kind of gelatin, developed as a plasma substitute, is being used at medical stations just behind the front.

Stockpiling of both chemicals has been recommended to defense authorities by the National Research Council. Their use in Korea now is a trial by special study teams. The safety and efficiency of the two chemicals has already been tested in civilian hospitals. Their value in actual military operations is now being tested.

Whole blood is needed, regardless of the results of these trials. These two chemicals and a third, polyvinyl pyrrolidone, or PVP for short, and blood plasma itself, are "a second line of defense," Dr. M. C. Winteritz, chairman of National Research Council's division of medical science, declared.

"They are life-savers in shock, the condition most feared by military surgeons in World War II. All will restore the volume of circulating blood, which is necessary to keep the patient alive until treatment aimed at the cause of the shock can be given.

"Just the same, there is no real substitute for whole blood and none is in sight," he declared. "It is the best treatment for shock, regardless of cause. And when blood has been lost, or blood cells damaged as by severe burns or atomic radiation, only blood itself can promptly replace what is missing."

Red blood cells, however, keep only 21 days. Blood therefore cannot be stockpiled. That is why blood and more blood must be continuously given through the National Blood Program of the American Red Cross. To eke out the supply and save life when blood is not immediately available, the substitutes may be used.

Dextran is being used at the front because it stays liquid at any temperature. Gelatin, which hardens at room temperature or lower, cannot be used unless there are facilities for warming it.

Science News Letter, February 17, 1951

## CHEMISTRY

## Laboratory Ware Made From Aluminum Oxide

► HIGH-temperature crucibles and other laboratory ware are being made at the Wright-Patterson Air Force Base from aluminum oxide, the material used for making sapphires, it was revealed.

A feature of these crucibles is their strength. They will not break when dropped from a height of several feet. Their material is non-porous and is not subject to chemically-induced changes. The crucibles retain their strength up to a temperature of approximately 2,000 degrees Fahrenheit. Low temperatures do not affect the material.

Air Force engineers say the new material holds great promise for applications involving the high temperatures necessary to melt super-hard metals. Also, they say, it may be possible to use it as an alloy in making cutting tools to machine super-hard metals. Still another possibility is mixing metal and the ceramics for use in jet aircraft parts, such as jet turbine blades, that are subject to high temperatures.

Credit for the development of this new ceramic material is due to two German scientists now employed by the Air Force. They are Dr. E. Ryschkewitsch and Adolph Strott. They began their research in the early 1930's while still in Germany.

Their process involves a sintering, or firing, of the oxides somewhat similar to that used in clay pottery. However, much higher temperatures are required. They are able to produce the crucibles at a reasonable cost, but it would be too expensive for commercial adaptation as a substitute for household china.

Science News Letter, February 17, 1951

## ENTOMOLOGY

## Insecticide Failures Due to Faulty Use

► IF DDT does not kill fleas, ticks and lice that feed on your pets and livestock, you are still not without weapons.

There are new insecticides, some developed since the war, that will do the job if DDT fails. Methoxychlor, lindane, chlordane and dieldrin are among the promising newcomers. Dr. Elton J. Hansens of New Brunswick, N. J., reports (*JOURNAL, AMERICAN VETERINARY MEDICAL ASSOCIATION*, January).

Methoxychlor is chemically related to DDT, but is not as toxic to warm-blooded animals as its chemical cousin.

Pet and livestock owners whose insect-ridance campaigns are not successful are advised to check on their methods of application. Bad results can often be traced to faulty use, Dr. Hansens states.

Science News Letter, February 17, 1951

## PSYCHOLOGY

# Brain Waves of Genius

**Dr. Albert Einstein has his brain waves taken to help study of meaning of electrical impulses from nerve cells. Active brains may have scanning mechanism like radar.**

By JANE STAFFORD

► WILL we be able in the future to predict geniuses by means of their brain wave records? Will scientists be able some day to put a finger on the wavy lines on paper that are the written record of electrical impulses accompanying brain activity and say:

Those spikes, that rhythm, those phase relationships mean this boy or girl has the brain of an Einstein?

The possibility seems remote now, but latest brain wave studies are pointed in that direction. And regardless of whether geniuses can ever be predicted by such means, new techniques of brain wave study hint of an approach to a better understanding of how the millions of nerve cells making up the human brain make us feel, think and behave.

A beginning of the study of the brain waves of genius has already been made. The first step, recording the brain waves of Prof. Albert Einstein, has been taken. This was done by a young Latin American scientist, Dr. Alejandro P. Arellano Z., from the Medical School of San Marcos University, Lima, Peru. Dr. Arellano has been carrying on brain wave research with Dr. Robert S. Schwab at the Massachusetts General Hospital, Boston, as a special research fellow of the U. S. Public Health Service's National Institute of Mental Health.

Prof. Einstein's brain wave record while thinking of the theory of relativity is plainly different, as anyone can see, from the record while he was resting. This was to be expected. Your brain wave record and mine while doing such relatively humdrum thinking jobs as adding up the grocery bill or making out the income tax return would be different from our brain wave records taken while we were resting.

### Different Scanning Mechanism

The difference between the brain wave record of an Einstein or another genius and a non-genius brain lies in phase relationships and anatomical distribution of wave changes and suggests that different scanning mechanisms are present.

So far Dr. Arellano has taken brain wave recordings from three great thinkers of our age, all of them mathematicians: Prof. Einstein, Prof. J. von Neumann, also of the Institute for Advanced Study at Princeton, and Prof. Norbert Wiener of Massachusetts Institute of Technology.

The brain wave records from Professors Einstein and von Neumann show similarities to each other and differences from non-genius brain waves. Prof. Wiener's record is not entirely comparable to the other professors' because he was "exceedingly drowsy during the test," Dr. Arellano stated in his report to the Eastern Association of Electroencephalographers. To a lesser degree, however, he showed, during sleep, brain activity similar to that of the other professors, enabling the experts to detect differences in his brain wave record from that of non-genius brains.

Whether these differences really indicate the genius type of brain activity cannot be concluded as yet. Brain wave records from many more than three great thinkers will have to be taken and studied. Neither Dr. Arellano nor any other scientist would draw conclusions on the basis of only three persons' brain wave records. Some of the techniques used by Dr. Arellano, however, are expected to lead to better knowledge of how brains think. Dr. Arellano, himself, believes from his research that some very

active brains, such as those of Einstein and the other two professors he studied, use a scanning mechanism similar to that of radar.

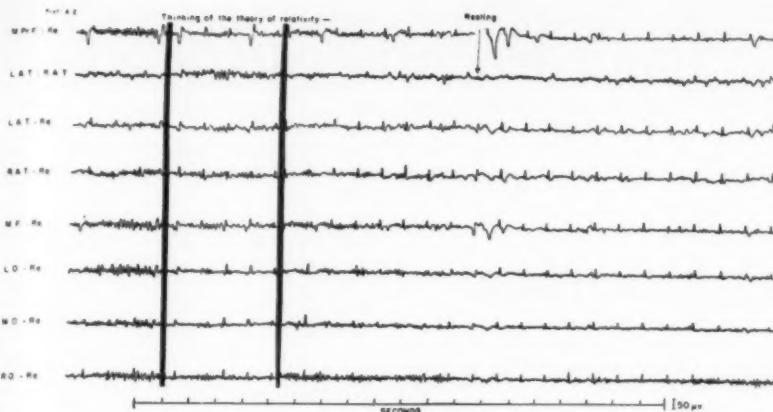
As Dr. Arellano sees it, thinking is done by different groups of nerve cells in the front and sides of the brain. He has brain wave records showing electrical and therefore nervous activity, presumably thinking, going on both on the sides over the temple regions and the front of the brain. Very active brains capable of abstract thinking of a high order do this kind of thinking, according to Dr. Arellano's theory, by switching rapidly from one group of brain cells to another, in other words by scanning as radar does by turning swiftly from one side of the field to another. The scanning mechanism of the brain shows up in differences in rhythm and in phase relationships of the waves recorded on paper.

Differences in the rhythm of brain waves were observed very early in the use of this new research and diagnostic tool. The German scientist, Dr. Hans Berger of Jena, discoverer of brain waves, detected two kinds. Big waves he called alpha waves. Smaller ones he called beta waves.

The alpha waves, Dr. Berger found, became smaller when the patient was under certain types of anesthetic, during an epileptic seizure, and when the person being



**BRAIN WAVES TAKEN—Dr. Albert Einstein cooperated with medical science by allowing his brain waves to be recorded both while relaxed and while thinking of a difficult problem in his famous theory of relativity. Dr. Alejandro P. Arellano, Peruvian medical scientist, is making the measurements.**



**THOUGHTS OF GENIUS**—The character of Dr. Albert Einstein's brain waves, as shown by these electroencephalograms, is different when he is thinking about a mathematical problem, in this case the Einstein theory of relativity, than when he is relaxed and his brain is not working actively.

studied did a "mental" problem or had his senses stimulated. The waves are largest, he found, when a person is relaxed.

Brain waves created their first excitement in scientific and lay circles in the early 1930's, but they have their beginnings in discoveries made a century earlier. Medical knowledge of the electrical properties of living tissues dates from the researches of Prof. Emil du Bois-Reymond, beginning in 1843. It is the electrical properties of living tissues that enable modern scientists, using the technical advances of modern electrical and radio engineers, to study the action of heart, muscle, nerves, and now the brain itself.

The idea of measuring and figuring the variations of action currents from the living heart by leading them off through "electrodes" placed on the moist skin and connected with that important electrical instrument, the galvanometer, first occurred to Augustus D. Waller in 1889. His method was improved on, made accurate and the name "electrocardiogram" coined by Willem Einthoven of Leyden in 1902.

Using radio apparatus, Prof. E. D. Adrian of Cambridge University was able to detect the electric current passing along a single nerve fiber. For this achievement, he shared in the Nobel Prize for 1932 in medicine and physiology.

Then Dr. Berger found that the changes in electrical potential connected with human brain activity may be magnified by running them through a vacuum-tube amplifying system. He used the enhanced current to operate an oscillograph which wrote in light on a photograph a wavy line corresponding to the fluctuations of the electricity in the brain. Brain wave records now are usually written on paper.

When Dr. Berger first started making electroencephalograms, as brain wave rec-

ords are called in scientific circles, he thought it was necessary to penetrate within the head to obtain the brain current record. So he inserted needle electrodes through the patient's skin. Later other brain wave researchers found they could fasten pieces of metal next to the skin on the head and use these as electrodes to pick up the current without giving the patient even the prick of a needle.

Early brain wave records were made from electrodes placed on the scalp. In 1938 scientists first started putting an electrode up the nose onto the pharynx, back of the nose and mouth, in the hope of getting records of electrical activity near the hypothalamus at the base of the brain. Dr. Arellano and an associate, Dr. P. D. MacLean, went one step further. They use, besides the scalp electrodes, one up each nostril and one at each ear to get currents through the ear drum.

With this hook-up they get a rhythm, or brain wave, which increases in amplitude and amount with mental activity, or during the time when a patient is emotionally upset. This rhythm appears in about 15% of normal people, about 35% of people with simple headache, and in about 65% of people suffering from migraine headache. This wave comes through with greatest voltage at the ear drum electrode which picks up currents nearest the part of the brain believed concerned with feelings.

An early practical application of brain waves was in the diagnosis of epilepsy. Characteristic rhythms were found in epileptics. Dr. Arellano's study of brain waves in epilepsy seems leading to new knowledge of different parts of the brain involved in making the different epileptic rhythms.

Changes in brain waves during anesthesia were another early finding which has had practical application. At the Mayo

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Clinic, brain waves are used to show when the patient on the operating table needs more or less of an anesthetic and even, by a special mechanical hook-up, to regulate the dosage of anesthetic automatically.

Finally, there is the finding reported some years ago that brain waves go on after death. When the supply of blood or oxygen to the brain was cut off, the brain

waves stopped within a few seconds of death. But when cats were killed by injections of calcium, potassium or magnesium, their brain waves continued for 15 minutes after the chemical killing, and might have gone on longer if the scientists had been able to continue their observations longer.

Science News Letter, February 17, 1951

#### PLANT PATHOLOGY

## Chestnut Trees Doomed

**Total stand in Italy and southern Switzerland and perhaps later in all Europe may be destroyed by same disease that wiped out American chestnut some years ago.**

► TOTAL destruction of all chestnut trees in Italy and southern Switzerland and possibly later on in all of Europe by the ravaging chestnut blight was predicted in Washington.

The blight, now hitting both chestnut and oak trees, is likely to rage uncontrolled all over Europe, G. Flippo Gravatt, Agriculture Department specialist in tree diseases, told the Botanical Society of Washington.

It is the same disease that, brought into this country on Oriental chestnut trees,

spread rapidly and wiped out the American chestnut.

Chestnut trees are commercially important in Europe, particularly in Italy. The wood is used in making wine barrels, tanning compounds are extracted from chestnut logs and baskets are woven from the split branches. About 15 to 20 million pounds of chestnuts are exported yearly from Italy to the U. S.

Italian and ECA officials, worried about the blow the chestnut blight would strike at the Italian economy, are buying and planting blight-resistant trees developed in the U. S. Over 100,000 of the resistant type are already growing in Italian nurseries.

In many Italian villages, chestnut stands furnish around 80 % of the total income for that locality. There is no other crop that could be planted that would bring so much return from the same, often mountainous land, Mr. Gravatt stated.

Strict quarantine is the most effective way to fence in the blight and keep it from raging throughout Europe. Although it was first reported in Europe in 1938, the war prevented action to counteract the blight's attack by planting disease-resistant varieties.

Science News Letter, February 17, 1951

#### HORTICULTURE

## Home Garden Program Gets Green Light

► A SPECIAL push to get more vitamin-packed vegetables from home gardens this year was endorsed by Secretary of Agriculture Charles F. Brannan.

The department will not, however, urge an all-out effort such as helped to put over the Victory Gardens during the last war.

The national emergency and high food costs are two of the reasons why added emphasis on a national home garden program is favored at this time.

In case of A-bomb attack, areas cut off from food supplies could use local com-

munity or individual gardens as food sources if they were not contaminated by radiation.

Federal and state agricultural extension services will be responsible for the program. The Secretary's plan followed recommendations made by an advisory group that met in Washington recently.

The action is timely for about now is when the home gardener looks over his seed catalogues and plans his garden for spring planting.

Experts report that there are enough fertilizers for the proposed step-up in home planting, although there is a slight possibility of some fertilizers being available only in large packages, amounts greater than one home gardener might need.

There is enough seed for the expected demand and sufficient insecticides to control insects and diseases.

The program will insure that the machinery is set up for all-out push on home gardening if the national situation makes it necessary as it was during the last war.

Home canning of home garden products is another project booked for limited expansion this year.

Science News Letter, February 17, 1951

#### HORTICULTURE

## Home Gardens Can Grow Mild Hybrid Onions

► HOME GARDENERS can now grow their own mild onions, with probably double the yield they would normally get, using hybrid seeds available to them as well as to commercial growers.

Dr. Henry A. Jones, plant breeder at the Department of Agriculture, states that the most striking fact about the hybrids is their great uniformity.

"When a field has been planted with these hybrid seeds," he said, "row after row will yield onions that look alike, have the same color and are the same size. The percentage of top grade onions will be high and the number of culled, low."

Successful hybrid onions are not always so classified because of higher yield, Dr. Jones warned. Yields vary with location, and often it is more important to have an onion that matures a month ahead of the standard variety, even though the yield is then not so great.

To get the best possible hybrid onion for various locations, seedsmen and State agricultural experiment stations have been making experimental plantings for several years, but there are still more crossings to be made, Dr. Jones said.

Science News Letter, February 17, 1951

Several important shipping ports in the world are equipped with shore-based radar which note approaching vessels in foggy weather; radar operators direct the ships by radio.

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## AERONAUTICS

# Helicopter Control Easier

New automatic pilot and stabilizing device relieves pilot of constant control. Brain of new unit is three gyros which keep craft on even keel.

► THE DIFFICULT job of handling a helicopter in the air is made easier by a new automatic pilot and stabilizing device revealed at the Wright-Patterson Air Force Base. It relieves the pilot of the present need of keeping his hands constantly on the controls.

It is the result of combined research of the Air Force, Navy and the Coast Guard. It is based on the Minneapolis-Honeywell E-6 automatic pilot used as standard equipment on our largest and newest bombers. The actual construction was by Goodyear Aircraft Corporation, Akron, Ohio, following designs prepared by the armed forces.

Conventional airplanes have used automatic pilots for several years but the types employed have been unsatisfactory for helicopters. This type of aircraft, now coming into very wide usage, is harder to fly than

the conventional plane, requires expert handling and keeps the pilot busy every moment.

The brain of the new unit is embodied in three gyros which send out electronic signals at the slightest pitch or roll of the helicopter. These signals activate delicate mechanisms located behind the pilot's seat which in turn reacts on the proper control mechanism to put the craft back on an even keel.

The pilot has a master control on the instrument panel. With this he can turn on the device or disengage it while in flight. When the helicopter is once in the air, the pilot can point it on its compass heading and relax as far as flying is concerned. If he needs to maneuver quickly, he switches off the device and takes over the ordinary controls.

Science News Letter, February 17, 1951

## PHOTOGRAPHY

# New Photographic Process

► ON-THE-SPOT pictures in areas teeming with radioactivity can now be taken without fear of fogging the film. No darkroom is needed for developing and time to finished picture is only two minutes.

Attraction between very fine charcoal dust and electricity on a charged plate does the trick. Ordinary photographic film is badly fogged, even though not exposed to light, when near radioactive materials.

Development of the camera, called "Two-minute Minnie," was sponsored by the Army's Signal Corps. Time from shutter to picture will be cut to one minute within a year, it is predicted.

The plates can be used over and over

again merely by wiping off the image, since no chemicals are needed for developing. The metal plate is coated with the element selenium and is sensitized by an electric charge.

When the shutter is open and light hits the charged plate, the electricity leaks off the sensitized material in proportion to the amount of light received and is grounded on the plate. What is left is an invisible electrical image that becomes apparent when finely ground charcoal or anthracite coal powder is blown across the face of the plate. Wherever the electrical charge remains, the dust sticks. The more electricity left on the plate, the more powder adheres.

The powdered image can then be transferred to ordinary paper or other material coated with an adhesive layer such as rubber cement. To protect the surface and fix the print, a clear transparent plastic film is pressed against the picture.

The picture has tones similar to that of an ordinary black and white photograph and it can be made into a transparency from which enlargements can be produced.

The Battelle Memorial Institute, Columbus, Ohio, and the Haloid Company, Rochester, N. Y., developed the camera under Signal Corps sponsorship.



**NEW PROCESS**—This portrait was made by a new process that can produce fog-free pictures even in areas with atomic radiation. There is no need for a darkroom or usual developing materials. A selenium-coated plate is sensitized with an electrical charge. This leaks off in proportion to light received by the plate. Then fine charcoal is blown across the plate. Where the electric charge is greatest the most dust sticks, forming the image.

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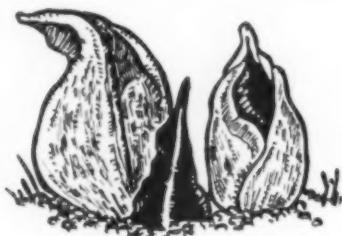
**GUTHRIE E. JANSEN**

Consultant on Human Relations

Lakeville, Connecticut

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Science News Letter, February 17, 1951



Spring's Harbinger

IT WILL be several weeks yet before the spring poets unlimber their lyres and begin to sing the praises of crocuses and hepaticas and shy, modest violets. But the hardiest harbinger of spring, the skunk cabbage, is at this moment probing its way up through the frozen soil, and even cracking thin ice on swamps, all over the East and throughout most of the Mississippi valley.

This sturdy flower defies a frosty and unfriendly world wherever the flat floor of a swamp or bog gives space enough for its rather expansive temperament. Right along with the alders, earlier than the pussy-willows, offering competition to that strange winter-flowering shrub the witch-hazel, the skunk cabbage comes into bloom.

You can find skunk cabbages determinedly pushing plates of ice away, and unfolding their grotesque flower-sheaths through the holes they have made for themselves, with the thin sheets of frozen water leaning edgewise against them. If

a thaw lets these plants get started, a subsequent freeze is of no avail; they keep right on coming in spite of it. It would take a genuine cold wave, driving the frost deep into the ground again, to stop them.

This great precociousness on the part of skunk cabbage is made possible by its food hoard from the preceding summer. Like most vernal-flowering plants, it has a thick and fleshy rootstock, stored with starch, which supplies the energy and material needed for the growth it makes during a season when the sun gives scanty encouragement and the frozen earth even less. This precociousness also makes it possible for the skunk cabbage to produce blossoms and have the important business of making seed well under way before other plants have even started.

There is no real need for the spring poets to turn up their noses so superciliously at the skunk cabbage. It offends nobody's nostrils unless it is trodden on or otherwise abused—and who would not fight back then? In this it is like its malodorous namesake; for the skunk also does no offense unless he is offended against.

The rough, gargoyle-like flowers of the skunk cabbage appear thus early, and the leaves, which will stand broad and flat and green all summer long, come on considerably later, when the last of the blossoms is about ready to curl up and die. Later still, when the autumn frosts have abolished the leaves, you will find the fruits, round, spike-bristling clusters, suggestive of a medieval warrior's mace.

Science News Letter, February 17, 1951

## METEOROLOGY

**Radioactive Snow on D.C.**

RADIATION, which was far less than would be dangerous, probably came from the last atomic explosion in Nevada on the morning of Feb. 6.

RADIOACTIVE SNOW fell on the nation's capital on the afternoon of Feb. 7. The radiation, described by the National Bureau of Standards as giving a "definite increase in the background level," probably came from the last atomic explosion in Nevada on the morning of Feb. 6.

Dr. Edward U. Condon, director of the Bureau, emphasized that the amount of radiation was far from a hazardous level. He declared:

"You could play in this snow for days and days without harm coming to you. It was probably an amount one-thousandth to one-millionth of what would do any harm to a person."

Dr. Lauriston S. Taylor, head of the Radiation Section of the Bureau which made the measurements, declared that "the amount of radiation is about what you would expect from an A-bomb."

He added that he wouldn't mind eating the snow.

Weather Bureau experts said that meteorological conditions were such that particles of radioactive matter could have been carried from Nevada to the Washington area and brought down by the snow. However, the direction of the winds was such, it was said, that the particles probably came from the last bomb exploded.

The radiation was measured by melting a quantity of the snow in a crucible, evaporating it down and then applying a Geiger counter to the dry residue. An increase in radioactivity over the usual levels was measurable by laboratory methods, it was reported.

Checks on the kinds of radiation found

in the snow have not yet been made. However, when they are made, the results probably will not be released to the public. Information such as this would be useful to Soviet Russia in making deductions as to the kind of atomic explosions which took place in Nevada.

Radiation experts emphasized the difficulty of measuring abnormal radioactivity in snow or rain. It is believed that there is always some normal radioactivity present. Determining what is normal is necessary before deciding that any abnormal amounts are present.

Science News Letter, February 17, 1951

There are canyons on the bottom of the Pacific Ocean as large and majestic as the Grand Canyon itself, scientists now believe as a result of undersea photography.

The Jan.-Feb. issue of the Mathematics Magazine contains a remarkable article by Maurice Frechet on "Abstract Sets, Abstract Spaces and General Analysis". Anyone interested in mathematics will be fascinated by this article. We are publishing a series of similar articles on various courses in mathematics.

This same issue contains a delightful short article by E. T. Bell on "What Mathematics Has Meant to Me". This article initiates a series of similar ones by eminent mathematicians and men in various professions.

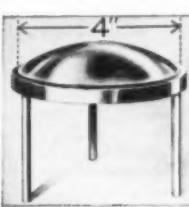
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# Books of the Week

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AIRPLANE AERODYNAMICS—Daniel O. Dommasch, Sydne S. Sherby and Thomas F. Connolly—*Pitman*, 520 p., illus., \$6.50. An advanced college text.

AN ATLAS OF THE CHROMOSOME NUMBERS IN ANIMALS—Sajiro Makino—Iowa State College Press, 2nd ed., 290 p., \$5.00. This first American edition has been revised and enlarged from the original Tokyo edition published in 1948. Approximately 3200 species of the invertebrates and vertebrates are listed.

THE BACKGROUND OF PLANT ECOLOGY—Henry S. Conard—Iowa State College Press, 238 p., \$5.00. A translation from the German of Anton Kerner's *The Plant Life of the Danube Basin*, published in 1863, which describes plant communities in the area from Switzerland to Transylvania in 1863.

BACTERIOLOGICAL STUDIES OF PHILIPPINE FISHERY PRODUCTS—John A. Clague and Crisanto Almario—Gov't. Printing Office, U. S. Dept. of Commerce Res. Report 27, 12 p., illus., paper, 10 cents.

BIRDS OF AMERICA: A Portfolio of Sixteen Plates—John James Audubon—*Marboro Books*, illus., paper, \$1.98. Each 8½ by 11 plate is printed on a linen-weave sheet, suitable for framing. Some of the birds included are the wild turkey, purple martin, meadow lark, woodpeckers and the bull finch.

BRAIN METABOLISM AND CEREBRAL DISORDERS—Harold E. Himwich—*Williams and Wilkins*, 451 p., illus., \$6.00. A review of research in this field intended as an aid in giving direction to further investigation.

THE COMPUTATION OF ELEMENTS OF ECLIPSING BINARY SYSTEMS—Zdenek Kopal—*Harvard Observatory*, 181 p., illus., \$5.00 (Leatherette cover: \$4.00). A monograph for the computer with a preface by Harlow Shapley.

COTTONSEED TREATMENT: ITS EFFECT ON SEEDLING EMERGENCE, SEEDLING SURVIVAL, PLANT STANDS, AND YIELDS—Committee on Cotton Seedling Diseases of the Cotton Disease Council—Gov't. Printing Office, U. S. Dept. of Ag. Tech. Bull. No. 1025, 134 p., illus., paper, 35 cents. A summary of a study made in 10 states from 1936 to 1942.

## WASHINGTON SCHOOL COLLECTION

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DOCTOR DAN: The Bandage Man—Helen Gaspar—*Simon and Schuster*, 26 p., illus., 25 cents. A child's book teaching first aid for simple scratches and bumps. A few adhesive bandages are attached to the cover.

THE GLORY OF THE GARDEN—Patience Strong—*Dutton*, 189 p., \$2.50. Leaves from the author's garden diary, arranged by months.

LIVER OIL PROPERTIES OF PHILIPPINE SHARKS AND RAYS—William S. Hamm—*Gov't. Printing Office*, U. S. Dept. of Commerce Res. Report No. 23, 5 p., illus., paper, 10 cents.

LONDON LESSONS IN GEOGRAPHY: Rodwell Jones Memorial Volume—L. Dudley Stamp and S. W. Wooldridge, Eds.—*Harvard University Press*, 351 p., illus., \$5.00. A survey of the nature of modern geography. Written by colleagues and students of Prof. Rodwell Jones, who at one time was head of the Joint School of Geography at King's College and the London School of Economics, University of London.

MAKING USEFUL THINGS OF WOOD—Franklin H. Gottshall—*Bruce*, 192 p., illus., \$4.50. Practical guide for making many useful objects including magazine holders, bedside tables, coffee tables and serving trays.

SCIENTISTS AT WAR—Wilfrid Eggleston—*Oxford University Press*, 291 p., illus., \$4.00. The story of the achievements of Canadian scientists during World War II, largely conducted through the Canadian National Research Council.

THE SOLDIER'S LOAD AND THE MOBILITY OF A NATION—S. L. A. Marshall—*The Combat Forces Press*, 122 p., illus., paper, \$1.00. Urging a lighter load for the fighting man.

TECHNICAL DRAFTING ESSENTIALS: For Vocational and Technical Students—Warren J. Luzadder—*Prentice-Hall*, 326 p., illus., \$4.00. A college text on engineering drafting.

TOOLS FOR FOOD PREPARATION AND DISHWASHING—Elizabeth Beveridge—*Gov't. Printing Office*, U. S. Dept. of Ag. Home and Garden Bull. No. 3, 31 p., illus., paper, 10 cents. What is needed in the kitchen, how to select equipment and care for it.

VOLCANIC GEOLOGY, HOT SPRINGS, AND GEYSERS OF ICELAND—Tom F. W. Barth—*Carnegie Institution of Washington*, 174 p., illus., paper, \$5.00 (Cloth bound: \$5.50). A study of Iceland's thermal activity in relation to volcanic activity.

Science News Letter, February 17, 1951

The 2,500,000 increase in America's population in 1950 is attributed to the near-record birth rate.

Snow falling on farm fields in semi-dry areas is sometimes pushed into ridges by farmers using bulldozers to keep it from blowing away.

## NEW WAY to preserve Science Specimens

Embed in Clear Liquid Plastic—the Method Now used by Leading Universities



Scorpion embedded in Castolite. Human embryo embedded in Castolite. Photos, courtesy School of Medicine, Univ. of Ill.

\* The preservation of biological, anatomical, pathological, botanical and other specimens has long been limited to immersion in preservative liquids or to mounting dried samples.

Now, thanks to recent research in the chemical field, a new liquid plastic has been developed which provides the perfect, permanent medium for embedding insects, plants, embryos, mineralogical and other specimens. This new plastic, known as Castolite, has already been tested and approved for specimen preservation by hundreds of the country's most progressive educational institutions, ranging from elementary schools to leading universities, such as Harvard, Yale, M.I.T., Chicago U., Universities of Ill., Wis., Calif. and many others of equal standing.

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**INFRARED** cooking lamps, to replace ordinary coil-wire heating elements in household kitchen ranges, give instantaneous heat output and fast action, particularly where small quantities of food are being cooked. They are high-wattage, gold-reflector heat lamps, which employ a special heat-resistant glass.

Science News Letter, February 17, 1951

**IRON-CORD** guide, for use with an ironing board, consists of a plastic ring held a few inches above the end of the board by a clip-on wire bracket. Electric cord to the iron passes through the ring, and weights attached to the cord hold it taut between ring and iron.

Science News Letter, February 17, 1951

**SILICONE** polish for furniture, containing the organic-silica product developed during the war, gives a protective, somewhat glass-like film on wood, enamel, porcelain and leather surfaces. Wiped on like water, it dries quickly, and then rubs easily to a bright luster.

Science News Letter, February 17, 1951

**ELECTRIC PAINT PEELER** is a chisel-like device with its handle raised at an angle to permit easy holding when the blade is flat on the painted surface. Heating elements within the blade develop enough heat to soften the old paint so that it can be pushed off with the scraper edge.

Science News Letter, February 17, 1951

## Do You Know?

A 200-pound hog yields about 22 pounds of lard.

Coal reserves represent 95% of America's fuel resources.

Lipstick is the cosmetic most universally used in America.

America's number one fish in the volume caught is menhaden.

In the Great Smoky Mountains National Park there are 140 species of trees.

Lameness in chickens and pigs is sometimes due to a manganese deficiency in the body.

The galvanizing industry, which applies protecting coatings of zinc to iron and steel, is the largest user of slab zinc in the United States.



vibrates that require months of practice to produce with a standard harmonica.

Science News Letter, February 17, 1951

**DIAMOND NEEDLE** for the phonograph, mounted in the various shanks and holders for most standard pickups, is claimed to outlast 90 sapphire needles and to be far more gentle on record grooves than other needles because it retains its rounded polished shape.

Science News Letter, February 17, 1951

**KIT POCKET** for golfers is worn on a waist belt and contains space for golf balls, cigarettes, matches, compact, automobile keys and wallet. A zipper fastener, extending across the entire top, keeps contents safe. Being small in size, it allows freedom of movement.

Science News Letter, February 17, 1951

**SEAMLESS BOTTLES** made of aluminum, for medical products, essential oils and extracts, are made in sizes from 0.5-ounce up, and are fitted either for screw caps or cork stoppers. They are light in weight, strong, durable and non-toxic.

Science News Letter, February 17, 1951

**HORN HARMONICA** for the youngster, shown in the picture, has a molded-on amplifying horn made of a durable plastic on the rear edge of an ordinary harmonica. Hand movements over the bell of the horn easily produce violin sounds, tremolos and

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